amino acid sequence which provides the binding activity of the Heparin-II binding domain of fibronectin and a second amino acid sequence which provides the cell-binding activity of the CS-1 domain of fibronectin, to increase the frequency of transduction of the hematopoietic cells by the retrovirus vector.

44. (Amended) A cellular grafting method, comprising:

introducing into a mammal as a cellular graft, viable hematopoietic cells transduced by retroviral-mediated gene transfer in the absence of retroviral producer cells and in the presence of an immobilized amount of a polypeptide containing a first amino acid sequence which provides the binding activity of the Heparin-II binding domain of fibronectin and a second amino acid sequence which provides the cell-binding activity of the CS-1 domain of fibronectin, said immobilized amount of polypeptide being effective to increase the frequency of transduction of the hematopoietic cells by the retrovirus vector.

52. (Amended) A method for increasing the frequency of transduction of hematopoietic cells in vitro by a replication-defective recombinant retrovirus vector, comprising infecting hematopoietic cells with a replication-defective retrovirus vector in the presence of an effective immobilized amount of a recombinant polypeptide containing a first amino acid sequence represented by the formula:

Ala Ile Pro Ala Pro Thr Asp Leu Lys Phe Thr Gln Val Thr Pro Thr Ser Leu Ser Ala Gln Trp Thr Pro Pro Asn Val Gln Leu Thr Gly Tyr Arg Val Arg Val Thr Pro Lys Glu Lys Thr Gly Pro Met Lys Glu Ile Asn Leu Ala Pro Asp Ser Ser Ser Val Val Val Ser Gly Leu Met Val Ala Thr Lys Tyr Glu Val Ser Val Tyr Ala Leu Lys Asp Thr Leu Thr Ser Arg Pro Ala Gln Gly Val Val Thr Thr Leu Glu Asn Val Ser Pro Pro Arg Arg Ala Arg Val Thr Asp Ala Thr Glu Thr Thr Ile Thr Ile Ser Trp Arg Thr Lys Thr Glu Thr Ile Thr Gly Phe Gln Val Asp Ala Val Pro Ala Asn Gly Gln Thr Pro Ile Gln Arg Thr Ile Lys Pro Asp Val Arg Ser Tyr Thr Ile Thr Gly Leu Gln Pro Gly Thr Asp Tyr Lys Ile Tyr Leu Tyr Thr Leu Asn Asp Asn Ala Arg Ser Ser Pro Val Val Ile Asp Ala Ser Thr Ala Ile Asp Ala Pro Ser Asn Leu Arg Phe Leu Ala Thr Thr Pro Asn

Ser Leu Leu Val Ser Trp Gln Pro Pro Arg Ala Arg Ile Thr Gly Tyr Ile Ile Lys Tyr Glu Lys Pro Gly Ser Pro Pro Arg Glu Val Val Pro Arg Pro Arg Pro Gly Val Thr Glu Ala Thr Ile Thr Gly Leu Glu Pro Gly Thr Glu Tyr Thr Ile Tyr Val Ile Ala Leu Lys Asn Asn Gln Lys Ser Glu Pro Leu Ile Gly Arg Lys Lys Thr

or a sufficiently similar amino acid sequence thereto to exhibit the ability to bind retroviruses;

and a second amino acid sequence represented by the formula:

Asp Phe Leu Pro Gln Leu Val Thr Leu Pro His Pro Asn Leu His Gly Pro Glu Ile Leu Asp Val Pro Ser Thr

or a sufficiently similar amino acid sequence thereto to exhibit the ability to bind primitive hematopoietic cells.

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62. (Amended) A cellular grafting method, comprising:

introducing into a mammal as a cellular graft, viable hematopoietic cells transduced by retroviral-mediated gene transfer in the absence of retroviral producer cells and in presence of an effective immobilized amount of a recombinant polypeptide which increases the frequency of transduction of the hematopoietic cells, said recombinant polypeptide containing a first amino acid sequence represented by the formula:

Ala Ile Pro Ala Pro Thr Asp Leu Lys Phe Thr Gln Val Thr Pro Thr Ser Leu Ser Ala Gln Trp Thr Pro Pro Asn Val Gln Leu Thr Gly Tyr Arg Val Arg Val Thr Pro Lys Glu Lys Thr Gly Pro Met Lys Glu Ile Asn Leu Ala Pro Asp Ser Ser Ser Val Val Val Ser Gly Leu Met Val Ala Thr Lys Tyr Glu Val Ser Val Tyr Ala Leu Lys Asp Thr Leu Thr Ser Arg Pro Ala Gln Gly Val Val Thr Thr Leu Glu Asn Val Ser Pro Pro Arg Arg Ala Arg Val Thr Asp Ala Thr Glu Thr Thr Ile Thr Ile Ser Trp Arg Thr Lys Thr Glu Thr Ile Thr Gly Phe Gln Val Asp Ala Val Pro Ala Asn Gly Gln Thr Pro Ile Gln

Arg Thr Ile Lys Pro Asp Val Arg Ser Tyr Thr Ile Thr Gly Leu Gln Pro Gly Thr Asp Tyr Lys Ile Tyr Leu Tyr Thr Leu Asn Asp Asn Ala Arg Ser Ser Pro Val Val Ile Asp Ala Ser Thr Ala Ile Asp Ala Pro Ser Asn Leu Arg Phe Leu Ala Thr Thr Pro Asn Ser Leu Leu Val Ser Trp Gln Pro Pro Arg Ala Arg Ile Thr Gly Tyr Ile Ile Lys Tyr Glu Lys Pro Gly Ser Pro Pro Arg Glu Val Val Pro Arg Pro Arg Pro Gly Val Thr Glu Ala Thr Ile Thr Gly Leu Glu Pro Gly Thr Glu Tyr Thr Ile Tyr Val Ile Ala Leu Lys Asn Asn Gln Lys Ser Glu Pro Leu Ile Gly Arg Lys Lys Thr

or a sufficiently similar amino acid sequence thereto to exhibit the ability to bind retroviruses;

and a second amino acid sequence represented by the formula:

Asp Glu Leu Pro Gln Leu Val Thr Leu Pro His Pro Asn Leu His Gly Pro Glu Ile Leu Asp Val Pro Ser Thr

or a sufficiently similar amino acid sequence thereto to exhibit the ability to bind primitive hematopoietic cells.

84. (Amended) An improved method for cellular grafting, comprising the steps of:

obtaining viable mammalian cells from an animal donor;

infecting the cells with a replication-defective recombinant retrovirus vector containing exogenous DNA to produce transduced cells, the infecting being in the presence of an immobilized amount of fibronectin and/or a fragment thereof effective to increase the efficiency of cellular transduction by the retrovirus vector; and

introducing the transduced cells into a mammalian recipient as a cellular graft.